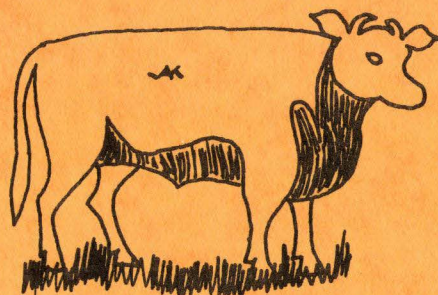
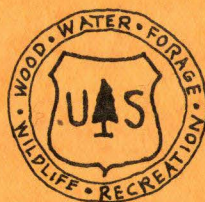
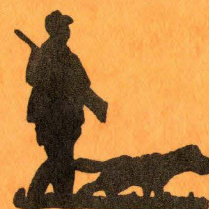
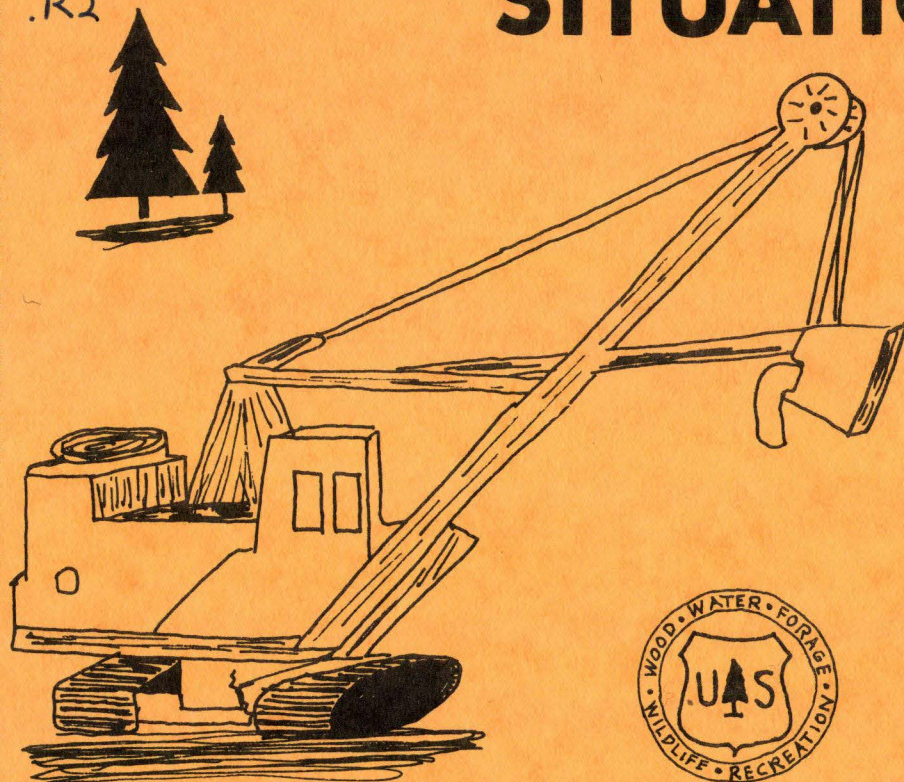


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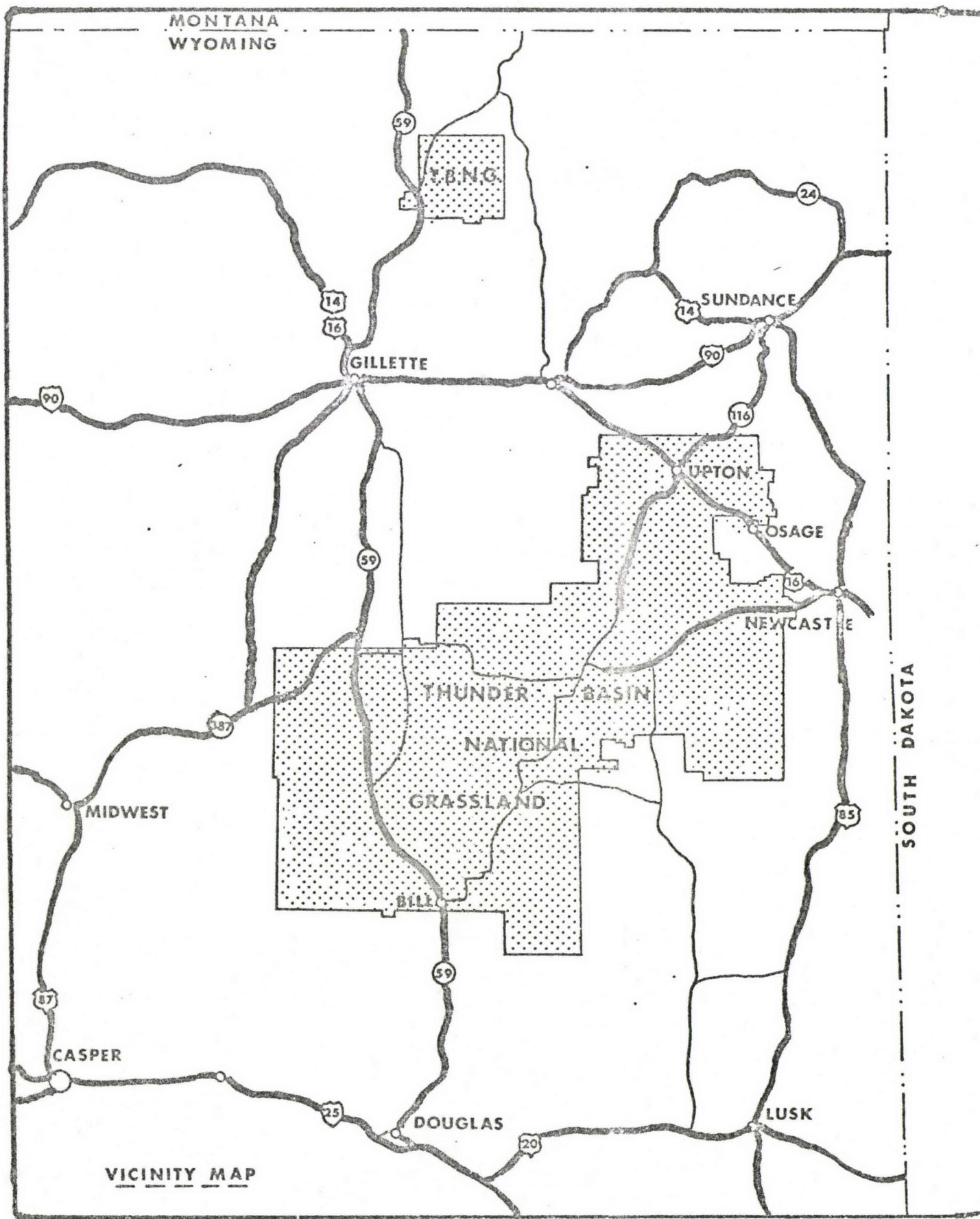
MANAGEMENT SITUATIONS



**THUNDER BASIN
NATIONAL GRASSLAND**

U.S.D. A.
FOREST SERVICE

1975?



PREFACE

This brochure is intended to broadly describe the physical, economic, and social situations which exist on the Thunder Basin National Grassland and which affect or are affected by management of this Grassland. The brochure is also intended to provide the reader with a basic knowledge of the principal resources found on the Thunder Basin National Grassland.

The reader who wishes specific resource or use information must go to more detailed documents such as the Grassland Multiple Use Plan, Range Management Plans, Minerals Environmental Analysis Reports, etc.

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MANAGEMENT SITUATION - NARRATIVE

THUNDER BASIN NATIONAL GRASSLAND

I. HISTORY:

The Thunder Basin National Grassland was initiated in 1934 as the Northeastern Wyoming Land Utilization Project under the Agricultural Adjustment Administration. The program since that time has been administered by the Resettlement and the Farm Security Administration, The Bureau of Agriculture Economics, and the Soil Conservation Service. The lands were transferred from the Soil Conservation Service to the Forest Service in 1954.

In 1960, the area was designated as a National Grassland unit with permanent status. The Grassland unit has been subdivided into three areas for grazing administration with a grazing association in each area. The Spring Creek Association in northern Campbell County; Inyan Kara Grazing Association in Weston County; and the Thunder Basin Grazing Association is in Converse, Campbell, Weston, and Niobrara Counties.

II. LAND OWNERSHIP:

The Thunder Basin National Grassland is entirely within the State of Wyoming. The Grassland is within five counties and is intermingled with other lands as follows:

	National Grassland Acres	State Acres	Private Acres	Total Acres Within N.G. Boundary
Weston	227,467.00	53,380.00	540,582.00	821,429.00
Converse	185,708.00	33,333.00	301,900.00	520,941.00
Niobrara	840.00	1,560.00	8,483.00	10,883.00
Campbell	158,002.00	25,073.00	263,288.00	446,363.00
Crook	302.00	0.00	0.00	302.00
	<u>572,319.00</u>	<u>113,346.00</u>	<u>1,114,253.00</u>	<u>1,799,918.00</u>
Ownership Percentage	32%	6%	62%	100%

III. PHYSICAL CHARACTERISTICS:

A. Land Form.

The Thunder Basin National Grassland is located in the Powder River Basin which is a topographic depression between the Bighorn Mountains and the Black Hills. Three distinct areas differing in average elevation, local relief, and type of landform may be delineated on the Grassland:

1. Upland Plains. The western edge of the grassland is characterized by a high rolling plateau, smoother and with less local relief than the areas to the east.
2. Escarpments. The upland plains is eroded on the east forming a rough escarpment 300-400 feet high, known locally as the Rochelle Hills. The east-facing escarpment is capped by a layer of erosion-resistant scoria. In some areas decreased subterranean volume caused by burning coal seams has resulted in slump and faulting overburden causing hummocky topography. Escarpment topography is also found in the northeastern portion of the Grassland.
3. Broken Dissected Plains. East of the Rochelle Hills escarpment is a gently rolling plain broken into knobs and ridges.

B. Climate.

The climate on the Grassland is temperate and semi-arid, with wide variations in precipitation and temperature between summer and winter seasons.

1. Seasonal Temperature Ranges and Growing Seasons. The Grassland has a short growing season, averaging 120 days, between the last spring and first fall freezes. Summer high temperatures above 90 degrees are common but the hot temperatures are moderated by cool nights. The coldest winter temperatures occur in January and February, occasionally to -40 degrees below zero.
2. Atmospheric Conditions. The prevailing winds on the Grassland are from the northeast with the strongest wind velocities recorded in the spring.
3. Annual Precipitation. Average annual precipitation ranges from 11 inches in the southern portion of the Grassland to 18 inches in the north. More than two-thirds of the annual precipitation falls between March and August of the average year. About one-third of the total annual precipitation is snowfall. The average annual snowfall is 50 inches and is well distributed through the winter and spring months with the heaviest snowfall in December.

C. Hydrology.

1. Surface Water. The surface of the Grassland is drained by the Powder, Little Missouri, Belle Fourche, and Cheyenne Rivers of the Missouri River System. The streams are intermittent, flowing

only during times of high surface runoff. Numerous small stockwater reservoirs impound water on many of the tributaries.

2. Groundwater. Groundwater quantity and quality are considered poor on the Grassland. Many of the aquifers have low permeability and contain unfavorable soluble minerals. Groundwater is predominantly used for ranch headquarters, livestock, and industrial purposes.

The total average annual water yield from the Thunder Basin National Grasslands is 11,446 acre-feet. The opportunity to increase water yield from this area is limited to snow fencing and/or weather modification.

D. Soils.

Soils on the Grassland are products of a semi-arid climate, vegetation and organisms acting upon interbedded sandstones, shales, and siltstones of the Fort Union, Wasatch, Pierre, and Mowry formations. The soils are characterized by a light gray-brown color and often have a lime-carbonate layer developed at shallow depths. Surface textures vary from sandy loams to clay loams and clays. Depth of altered bedrock is not more than 60 inches but the steeper areas have a much shallower soil cover and often are dominated by rock outcrop.

E. Vegetation.

The grassland has five major vegetation types as follows:

1. The grassland type consisting of western wheatgrass, blue grama and needle-and-thread in Weston County, covering approximately 51,000 acres of federal surface.
2. The sagebrush-grassland type has an overstory of big sagebrush with a western wheatgrass and blue grama understory. Prickly pear cactus occurs in dense stands throughout this type. There are approximately 462,000 of this type within the grassland on federal surface.
3. The cottonwood-greasewood type occurs in and along the drainage channels. Associated species in this type are big and silver sagebrush, western wheatgrass and inland saltgrass. There are approximately 11,000 acres of this type on federal surface.
4. Ponderosa pine-juniper zones range from a closed-canopy forest to a savannah-like open woodland. Bluebunch wheatgrass, blue grama and big sagebrush occur as understory species. This zone occupies approximately 45,000 acres of federal surface.

5. The badlands type is confined to three areas. Vegetation is sparse consisting of sagebrush, yucca and western wheatgrass. There are approximately 3,000 acres of this type on federal surface.

F. Wildlife and Fish.

The major big game species are antelope and deer. The large populations of antelope bring many sportsmen to this area. The deer population is scattered, with heavier populations in the better habitat areas. There is a small herd of elk (approximately 90 head) on the Rochelle Hills.

Waterfowl rest on many of the stock reservoirs during their migration. A few waterfowl nest in the grassland.

Other species include turkey, chukar partridge, sage grouse and doves.

Several of the water impoundments contain fish such as bass, perch, and bullheads, and trout.

IV. ECONOMIC SITUATION:

A. Livestock.

Approximately 572,000 acres of National Grasslands provide forage annually for livestock. Following is a summary of this use for 1974.

<u>Type Of Livestock</u>	<u>Livestock Numbers</u>	<u>Animal Months Use</u>
Cattle	17,165	106,123
Sheep	22,954	147,436

Almost all pastures within a ranch operation contain federal lands, so season of use varies. There are six community pastures.

There is an estimated 4,131,867 pounds of red meat production on federal land.

Range improvements constructed:

Dams & Dugouts	745
Water Wells	295
Springs developed	74
Fences	600+ miles
Water pipelines	26,106 feet

In the mid-1930's the size of ranches varied from 320 acres to 100,000 acres. The average ranch size was approximately 1900 acres. There were a total of 237 ranch operations.

In 1974 ranch size ranged from 3,140 acres to 250,000+ acres. The average ranch size is approximately 8,000 acres. There are 197 ranch operators.

B. Recreation

1. Developed Sites

Federal - none.

Private - none within the boundary; but there are private commercial campgrounds at Douglas, Gillette, Newcastle, and Upton.

2. Dispersed Areas Use

Hunting and camping

Fishing (warm water)

Snowmobiling in the northeastern part of grasslands

C. Land Use Administration

There are 279 special use permits for various uses on the Grasslands, including:

Range facilities	158
Pipeline miles	133
Powerline miles	84
Telephone line miles	26
Roads (all) miles	123

D. Mineral Industry

Known mineral deposits underlie large areas of the Grassland. Mineral leasing, exploration, and extraction activities are increasing due to new technological developments, better prices and the "energy crisis."

Coal - The Grassland contains a portion of the largest untapped coal reserves in the United States. Total economically recoverable reserves in the Grassland are estimated to be as high as 4.5 billion tons. These reserves are contained in the Fort Union formation in coal beds called the Wyodak, Roland, Felix, Smith, School and Anderson. There are presently 4 companies with leases within the grassland. These leases occupy 13,182 acres of National Grassland surface and 13,749 acres of private lands.

In addition to the existing coal leases there are 23 applications for preference right leases which cover 38,806 acres in the Grassland. The Department of Interior has a moratorium on granting new leases at this time.

By 1978 three companies are slated to open new strip mines on the Grassland. Each of these mines will produce 5 to 25 million tons of coal per year. A new railroad may connect Gillette with Douglas to transport the coal. A 1,043-mile-long coal-slurry pipeline may carry a coal-water mixture (slurry) from the Grassland to Arkansas as early as 1978. Other coal mines may develop on federal coal leases on the Grassland.

Oil and Gas - Oil and gas constitute the mineral resources in greatest production on the Grasslands at the present time. New fields are being discovered and developed. There are currently 43 developed oil fields with pipeline systems in the Grasslands.

There are sixteen known oil bearing sands that may be productive for oil and gas. They range in depth from 4000 feet to 18,000 feet, depending on the area. In addition to the above fields, there are several fields adjacent to the unit. Further exploration and drilling work are planned.

Leases on file	2961
Producing oil wells	780
Lease applications/yr.	549
Operating plans for proposed wells/yr.	340

Uranium - The uranium boom of the 1950's resulted in the location of many claims within and adjacent to the Grassland. Outside of the unit some of these claims have produced a substantial amount of valuable ore. Uranium activity is again picking up as new deposits of high quality ore are being discovered and mined. The uranium is extracted by strip mining and deep mining methods. An on-site ore processing mill has been constructed south of the Grassland. Plans to develop a mine and processing plant within the Grassland are under consideration.

Lease acreage	2560 Acres
Lease applications	12387 Acres
No. of mining claims	4500
Prospecting permits	11634 Acres

Other Minerals - Bentonite mines and the use of clinker material (scoria) may increase in the future.

E. Revenues to Counties from National Grassland Receipts.

Twenty-five percent of the revenues received for goods and services provided from the Grassland are returned to the counties in which the Grassland is located. Following is a table which reflects the actual revenue received by these counties for three different years:

<u>County</u>	<u>1961</u>	<u>1973</u>	<u>1974</u>
Campbell	\$ 5,432.01	\$12,693.55	\$19,910.34
Converse	6,375.17	14,919.13	23,401.31
Crook	10.97	24.26	38.06
Niobrara	28.79	67.49	105.85
Weston	7,801.07	18,272.97	28,662.21
TOTALS	\$19,648.01	\$45,977.40	\$72,117.77

V. SOCIAL SITUATIONS:

A. Population

As can be seen from the chart below, large increases in population are predicted as a result of the development of the energy resources.

Population Projections

	<u>1970</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Campbell	12,597	32,200	46,600	50,400
Converse	5,938	13,200	14,900	15,200
Crook	4,400	4,500	4,600	4,600
Niobrara	2,900	2,800	2,700	2,600
Weston	6,300	6,300	6,300	6,500
TOTALS	32,135	59,000	75,100	79,300

During this 20-year period, population will have expanded in the five-county region approximately 147 percent.

B. Employment

Current

Employment in the area increased during the ten-year period, 1960 to 1970, by approximately 80%. This increase resulted from the petrochemicals and other industries that established businesses. Unemployment in the Powder River Basin is lower than the national average. There has also been an increase in other manufacturing, but number of employees remains moderately low. Agriculture remains the principal source of employment even though there has been a slight decrease in the number of ranch operations.

Projections

Employment projections are based on estimated coal production and facilities (mines, gasification, and power generation). The employment projection figures assume the county of employment and residence are coincidental. Projection figures were provided by the Water Resources Research Institute, University of Wyoming, based on the employment and population projection model used for the Northern Great Plains Resource Program social and economic impact study.

Total employment for 1970 to 1980 is projected to increase by 41.4 percent and 20.6 percent from 1980 to 1990. After 1985, the employment surge begins to taper off due principally to the lack of introduction of any new coal gasification plants, and a reduced rate of increase of coal mining employment.

Employment in coal mining, coal gasification, power generation, railroads, construction, and uranium mining and milling sustains the greatest numerical and percentage growth increase during 1970 to 1990. Development of the coal resource will provide a large number of basic and secondary jobs which will compete for the available supply of labor. Skilled labor shortages for construction peaks during coal gasification plant and generating plant construction may be severe and could be worsened by simultaneous plant construction.

Agriculture will no longer be the dominant industry. It will fall from 22.4 percent of county employment in 1970 to 8.3 percent in 1980, and 6.6 percent in 1990. In its place will be an economy based more on energy and railroad transportation.

C. Incomes

Current Income Levels

The average median (\$10,125) and mean (\$11,070) are higher than the state average. The introduction of oil and coal development has contributed to generally higher income levels. Families with incomes greater than \$10,000 are approximately 51.95% of the employment sector; the state average is 42.6%. Families with incomes greater than \$15,000 are approximately 18.15%, which is higher than the state average of 15.6%. Families with incomes of less than \$5,000 are approximately 16.9% which is slightly below the state average of 20.3%.

Income Projections

Income levels for the entering coal or industrial worker will range from \$10,000 to \$15,000 per year. Whether or not these incomes are sufficiently attractive to lure employees to the coal fields is unknown. While incomes of the industrial workers will be high, incomes of the work force in supportive employment, e.g., government services and consumer services, may be relatively lower. The average income of the induced labor force will be greater than, or at least equal, to that of the region (\$10,900).

The gross Regional Product (GRP) for the Powder River Basin, in which the Grasslands is located, will increase from as estimated 1970 level of \$730,000,000 to a projected 1990 level of \$1,240,000,000 to \$1,410,000,000 (current dollars). The estimated GRP was derived from data in a 1972 report of the Wyoming Department of Economic Planning and Development.